

### **REMARKS**

These remarks are responsive to the Office Action of November 3, 2004. Claims 1-15 have been editorially amended for better form of US practice or minor informalities. New claims 25-33 have been added. No new matter is added. Claims 1-15 and 25-33 are pending. Applicants have amended the specification to reflect drawing changes as required by the Examiner. Reconsideration is respectfully requested.

#### **Objection to the claims**

The Examiner objected to claim 6 for reciting (45"). The typographical error has been corrected. Withdrawal of the objection is respectfully requested.

#### **Objection to the Drawings**

The Examiner objected to the drawings under 37 C.F.R. 1.83(a). 37. C.F.R §1.83(a) states:

The drawing in a nonprovisional application must show every feature of the invention specified in the claims. However, conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (e.g., a labeled rectangular box).

The Examiner asserts that the drawings must illustrate the "layer of gold" recited in claim 14. The "layer of gold" is disclosed in the specification (see, e.g., specification at page 14, lines 17-21). A detailed illustration of the "layer of gold" in the figures is not essential for the proper understanding of the invention. In response to the Examiner's objection, FIG. 18 is amended to include a "labeled representation" of the layer of gold pursuant to 37 C.F.R. 1.83(a). The

specification at page 14, lines 17-21 is also amended to refer to the “labeled representation” of the layer of gold. No new matter is added. Withdrawal of the objection is respectfully requested.

Rejections under 35 U.S.C. §102(b)

Claims 1-6 and 9-12 were rejected under 35 U.S.C. §102(b) as being allegedly anticipated by U.S. Patent No. 6,143,190 to Yagi et al. (Hereinafter “Yagi”). This rejection is respectfully traversed.

Claim 1 recites, among other features, that a groove made in a substrate comprises a first portion produced by dry etching and a second portion produced by electrochemical etching. The Examiner asserts that Yagi discloses a groove made in a substrate comprising a first portion (window 14 of FIG. 1C) produced by dry etching and a second portion produced by electrochemical etching (Col. 11, lines 21-42). Contrary to the assertions in the Office Action, Yagi fails to teach or suggest a first portion of a groove made in a substrate produced by dry etching and a second portion of the groove made in the substrate produced by electrochemical etching.

As relied on in the Office Action, Yagi discloses a mask layer 13 overlying the substrate 10. Notably, the mask layer 13 (as is the passivation layer 12) is merely deposited on the surface of the substrate 10 (see FIGS. 1A-1C and col. 11, lines 8-13). There is no teaching relied on in Yagi that the recited groove first portion (in the substrate) is produced dry etching. In the Yagi, the mask layer 13 is partially removed by means of reactive ion etching using CF<sub>4</sub> gas to form an opening 14 in the mask layer 13 (see FIG. 1C and col. 11, lines 13-19). This mask layer 13 is not made in the substrate but rather, is merely deposited on the surface of the substrate (col. 11, lines

10-13). Yagi fails to teach or suggest dry etching of the substrate in the groove. See FIG 1C, for example, illustrating an intact substrate after etching of the mask layer 13.

In the Office Action, it is asserted that Yagi discloses a second portion (of the groove made in the substrate) produced by electrochemical etching. The Office Action points to col. 11, lines 21-42 of Yagi for support. Yagi merely discusses etching a silicon substrate “using an aqueous solution of 27% potassium hydroxide (KOH) ... so as to form a ... hole.” See Yagi, col. 11, lines 31-35 and FIG. 1D. There is no electrochemical etching. Hence, Yagi is devoid of electrochemical etching of the groove made in the substrate as recited in the claim 1. Applicant note “The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Additionally, Applicants point out that “[f]or a prior art reference to anticipate a claim, the reference must disclose each and every element of the claim with sufficient clarity to prove its existence in the prior art.” *Motorola, Inc. v. Interdigital Tech. Corp.*, 43 USPQ 2d 1481, 1490 (Fed. Cir. 1997). In view of the foregoing, Yagi clearly lacks each and every feature as recited in claim 1. Accordingly, claim 1 is allowable over Yagi for at least the noted reasons. Claims 2-6 and 9-12 depending, directly or indirectly, from independent claim 1 are allowable for all the reasons given above, and further in view of the additional features recited therein.

Rejection under 35 U.S.C. §103(a) Yagi in view of Bhaskar

Claims 7, 8, 12, and 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Yagi et al. in view of Bhaskar (U.S. Pat. No. 5,635, 968). This rejection is respectfully traversed.

a. The Features of Yagi and Bhaskar are Not Met by the References

For claims 7, 8, 12, and 15, Applicants incorporate by reference the arguments with respect to claim 1. Yagi fails to teach or suggest dry etching of a first portion and electrochemical etching of a second portion of a groove made in the substrate as recited in claim 1. Hence, claims 7, 8, 12, and 15 depending, directly or indirectly, from independent claim 1 are allowable for all the reasons given above, and further in view of the additional features recited therein. When evaluating patentability under 35 U.S.C. § 103(a), all claim limitations must be considered, especially when they are missing from the prior art. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988) (Federal Circuit held a reference did not render the claimed combination obvious because the examiner ignored a claimed limitation that was absent from the reference).

Bhaskar fails to cure the deficiencies of Yagi. Neither Bhaskar, nor Yagi, either alone or in combination, teach or suggest a groove made in a substrate comprising a first portion produced by dry etching and a second portion produced by electrochemical etching. Yagi merely discloses wet etching of a substrate and provides no suggestion, need or rationale to modify the etching technique. Bhaskar, like Yagi, merely discloses standard wet etching with anisotropic etchants. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). Further with respect to claim 7, Bhaskar fails to teach or suggest the printhead with an N-well layer positioned for forming of a portion of the groove as recited. With respect to claim 8, Bhaskar fails to teach or suggest the printhead with a P+ layer positioned adjacent to the

substrate and within the groove between the N-well layer. Neither Yagi, nor Bhaskar, either alone or in combination teaches or suggests all the features of claims 7, 8, 12 and 15. Hence, these claims are allowable.

b. There is No Motivation to combine the Yagi and Bhaskar references

There is no motivation for one of ordinary skill in the art at the time the inventions were made to combine the references as suggested in the Office Action. In the Office Action, it is asserted that one of ordinary skill in the art would have been motivated to modify the disclosure of Yagi to incorporate the disclosure of Bhaskar “for the purpose of reducing the number of interconnections per driver, increasing the speed of the printhead, and reducing crosstalk.” See Office Action page, 6. Applicants disagree. It is quite clear that “[t]he mere fact that prior art could be modified would not have made the modification obvious unless the prior art suggested the desirability of the modification.” *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) (reversing an obviousness rejection).

The teachings of Yagi and Bhaskar are divergent. Yagi is concerned with solving a problem of the alignment of the through-hole by forming a (non-crystalline) dummy layer on the front surface of the substrate. The dummy layer 111 (e.g., poly-Si) acts as etch-stop layer for wet etching. Bhaskar is merely concerned with reducing restrictions in the passage of ink to the ink firing chamber to offset heat resistors. (See Bhaskar, col. 3, lines 27-37 and col. 5, lines 60-64). The Office Action points to col. 10, lines 27-30 and lines 60-64 for support. Notably, the P-type monocrystalline silicon 901 and source and drain (N+) of the transistor 905 of Bhaskar’s thermal printhead embodiment of FIG. 9, has absolutely nothing to do with “the purpose of reducing the number of interconnections per driver, increasing the speed of the printhead, and reducing

crosstalk” as alleged in the Office Action. Similarly, Bhaskar’s printhead does not pertain provide a solution to problems addresses by the Applicant’s printhead of claims 7, 8, 12 and 15.

As can be clearly seen at col. 10, lines 12-27 of Bhaskar, reproduced herein for ease of explanation, Bhaskar states that it undesirable for these elements and leads to **increased material and production cost**.

As mentioned previously, the integration of both heater resistors and FET driver transistors onto a common substrate has created a need for additional layers of conductive circuitry on the substrate so that the transistors could be electrically connected to the resistors and other components of the system. These additional layers have resulted in increased production and material costs. With reference to FIGS. 9-13, cross sectional representations of the printhead semiconductor substrate are provided which illustrate the process steps necessary to electrically connect the electrical contact regions of the drive transistors with the heater resistors and other printer components in the preferred embodiment. The term “electrical contact regions” for the preferred embodiment represents the source, gate, and drain of a field effect transistor.

Bhaskar, Col. 10, lines 12-27,

Hence, the alleged motivation relied in the Office Action is merely conclusory and provides no specific reason for one of ordinary skill to modify Yagi’s print head to provide, for example, an N-well layer or P+ layer as recited in claims 7 and 8. The rejection must be withdrawn. Further consider: *In re Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002), the U.S. Court of Appeals for the Federal Circuit vacated the decision of Board of Patent Appeals and Interferences of the U.S.P.T.O. rejection claims of the applicant based on a conclusory determination of obviousness. The standard requires “[w]hen patentability turns on the question of obviousness, the search and analysis of the prior art includes evidence relevant to the finding of whether there is teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness”. *Id.* at 61 USPQ2d 1433. Further, the Federal Circuit

stated “[o]ur case law makes clear that the best defense against the subtle, but powerful attraction of hindsight based obviousness analysis is a rigorous application of the requirement of a showing of the teaching or motivation to combine prior art references.” *In re Lee*, 61 USPQ2d at 1433 (quoting, *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999)). In view of the foregoing reasons, claims 7, 8, 13 and 15 are allowable.

Rejection under 35 U.S.C §103(a) under over Yagi in view of Garcia

Claims 13 and 14 were rejected under 37 U.S.C. §103(a) as being unpatentable over Yagi in view of Garcia (U.S. Patent No. 5,317,346). Claims 13 and 14 depend from claim 1. As set forth in the foregoing, Yagi fails to teach or suggest claim 1. Therefore, Yagi fails to teach or suggest claims 13 and 14. Garcia does not make up for the deficiencies of Yagi. When evaluating patentability under 35 U.S.C. § 103(a), all claim limitations must be considered, especially when they are missing from the prior art. *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988) (Federal Circuit held a reference did not render the claimed combination obvious because the examiner ignored a claimed limitation that was absent from the reference). In view of the foregoing, the rejections should be withdrawn.

New Claims 25-33

New claims 25-33 are allowable over the cited references. It is respectfully submitted that Yagi, Bhaskar and Garcia, either alone or in combination fail to teach or suggest a thermal ink jet printhead at least one nozzle connected to an ink chamber; a substrate, the substrate having a lower face, an upper face, and a groove for supplying ink, the groove extending into the substrate

from the lower face and towards the upper face, the groove comprising a top portion; an N-well layer positioned laterally for surrounding at least a portion of the groove as recited in independent claim 25.

For example, as set forth in the Office Action, among other features, Yagi lacks an N-well layer. Further with regard to claim 1, Bhaskar fails to teach the recited features an N-well layer positioned laterally for surrounding at least a portion of the groove. Garcia is deficient. Additionally, the references do not provide any teaching or suggestion for modifying the printhead of Yagi to arrive at the thermal printhead as recited in claims 25-33. Claims 26-33 depend from claim 25 and are allowable for at least the reasons set forth above for claim 25 and for further features recited therein.




Conclusion

For the foregoing reasons, it is respectfully submitted that this application is in condition for allowance. Should the Examiner believe that anything further is desirable in order to place the application in better form for allowance, the Examiner is respectfully urged to contact Applicant's undersigned representative at the below-listed number. If any additional fees are required or if an overpayment has been made, the Commissioner is authorized to charge or credit Deposit Account No. 19-0733.

Respectfully submitted,

BANNER & WITCOFF, LTD.

Dated this 3<sup>rd</sup> day of May, 2005

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**Amendments to the Drawings:**

The attached sheet of drawings includes changes to FIG. 18. This sheet replaces the original sheet including FIG. 18. FIG. 18 is amended to include a labeled representation of an example of the layer of gold.

Attachment: Replacement Sheet  
Annotated Sheet Showing Changes

12 / 15

Fig. 18

